IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): B.T. Doshi et al.
Case: 48-11
Serial No.: 09/588,490
Filing Date: June 6, 2000
Group: 2157
Examiner: Barbara N. Burgess

I hereby certify that this paper is being deposited on this date with the U.S. Postal Service as first class mail addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Signature: Lisa L. Vulpis Date: October 17, 2005

Title: Method and Apparatus for Protection Against Network Failures

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants hereby appeal the final rejection dated May 11, 2005 of claims 1-7 and 10-17 of the above-identified application.

REAL PARTY IN INTEREST

The present application is assigned to Lucent Technologies Inc., as evidenced by an assignment recorded June 6, 2000 in the U.S. Patent and Trademark Office at Reel 010868, Frame 0354. The assignee Lucent Technologies Inc. is the real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals or interferences.

STATUS OF CLAIMS

The present application was filed on June 6, 2000 with claims 1-17. Claims 8 and 9 were canceled in an amendment filed February 17, 2005. Claims 1-7 and 10-17 are currently pending in the application. Claims 1, 16 and 17 are the independent claims.

Each of claims 1-7 and 10-17 stands rejected under 35 U.S.C. §103(a). Claims 1-7 and 10-17 are appealed.

STATUS OF AMENDMENTS

There have been no amendments filed subsequent to the final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 is directed to a method of routing traffic between first and second nodes in a network so as to provide protection against network failures. The method includes the steps of routing units of traffic on corresponding sets of trunks connected between the first and second nodes such that the traffic is balanced between disjoint paths, and implementing a restoration process for the traffic. The first and second nodes are specified as being connected by first and second sets of trunks such that the nodes and sets of trunks form a ring having at least four trunks, with the first set of trunks carrying traffic in a given direction from the first node to the second node and being associated with one of an upper portion and a lower portion of the four-trunk ring, and the second set of trunks carrying traffic in the given direction from the first node to the second node and being associated with the other of the upper portion and the lower portion of the four-trunk ring. In addition, each of the first and second sets of trunks includes a primary trunk and a backup trunk, with both the primary trunk and the backup trunk of each of the first and second sets of trunks being configurable to carry traffic in the given direction from the first node to the second node. A given one of the units of traffic comprises a unit of traffic to be transmitted in the given direction from the first node to the second node utilizing one of the upper portion and the lower portion of the four-trunk ring. Further, the first and second nodes are configured to perform, in conjunction with the restoration process for the given unit of traffic, span switching between the primary trunk and the backup trunk of the associated portion of the four-trunk ring.

Independent claim 16 is an apparatus version of claim 1, directed to first and second network nodes.

Independent claim 17 is another apparatus version of claim 1, directed to the first network node.

An illustrative embodiment of the claimed invention is shown in FIG. 4 of the drawings and includes, as first and second network nodes, the nodes A and Z. The nodes A and Z are interconnected via primary trunks 152 and 156, shown as solid lines, and backup trunks 154 and 158, shown as dashed lines, in a four-fiber ring arrangement. The downward arrow 160 denotes a span switching operation from primary trunk 152 to backup trunk 154. A given unit of traffic to be routed from node A to node Z is routed on either the upper portion of the ring, using one or both of the trunks 152 and 154, or the lower portion of the ring, using one or both of the trunks 156 and 158. See the specification at, for example, page 6, line 25, to page 7, line 19.

Advantageously, such an arrangement makes more efficient use of redundant capacity than conventional techniques such as the "bridge and select" approach. See the specification at, for example, page 3, lines 1-8, and page 4, lines 25-28.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-7 and 10-17 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application Publication No. 2001/0003833 (hereinafter "Tomizawa") in view of U.S. Patent No. 5,986,783 (hereinafter "Sharma").

ARGUMENT

A proper *prima facie* case of obviousness requires that the cited references when combined must "teach or suggest all the claim limitations," and that there be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references or to modify the reference teachings. See Manual of Patent Examining Procedure (MPEP), Eighth Edition, August 2001, §706.02(j).

Applicants submit that the Examiner has failed to establish a proper *prima facie* case of obviousness in the present §103(a) rejection of independent claims 1, 16 and 17, in that the Tomizawa and Sharma references, even if assumed to be combinable, fail to teach or suggest all the

claim limitations, and in that no cogent motivation has been identified for modifying the reference teachings to reach the claimed invention. Further, even if it is assumed that a proper *prima facie* case has been established, there are particular teachings in one or more of the references which controvert the obviousness argument put forth by the Examiner.

As noted above, independent claim 1 recites that both the first set of trunks and the second set of trunks carry traffic in the same direction, referred to in the claim as "a given direction," from the first node to the second node. Moreover, both the primary trunk and the backup trunk of each of the first and second sets of trunks are configurable to carry traffic in the given direction from the first node to the second node.

In formulating the §103(a) rejection, the Examiner acknowledges that the Tomizawa reference fails to disclose a four-trunk ring arrangement meeting the limitations summarized in the preceding paragraph. See the final Office Action, at page 3. However, the Examiner argues that the missing teachings are found in Sharma. However, the Sharma self-healing four-fiber ring does not meet the limitations of claim 1, because in the Sharma four-fiber ring, a given set of four fibers includes two pairs of fibers, with each pair "carrying signals in opposite directions." See Sharma at, for example, column 2, lines 45-50.

Applicants presented the substance of this argument in their response filed February 17, 2005. The Examiner in the final Office Action at page 10, lines 1-2, responded to the above-described argument regarding claim 1 by stating that "nowhere in the claim does it state the given direction is the same for both sets of trunks." Applicants respectfully submit that the Examiner is misinterpreting the clear language of the claims. For example, claim 1 calls for a first set of trunks carrying traffic in a given direction from the first node to the second node and being associated with one of an upper portion and a lower portion of the four-trunk ring, and a second set of trunks carrying traffic in the given direction from the first node to the second node and being associated with the other of the upper portion and the lower portion of the four-trunk ring. Thus, the claim refers to a particular direction from the first node to the second node. This direction is introduced as "a given direction from the first node to the second node." Subsequent references to "the given direction" necessarily refer to the same direction that was originally introduced. To argue otherwise is to ignore the clear and unequivocal language of the claim.

In an Advisory Action dated September 20, 2005, the Examiner further addresses this issue by stating that it is unclear what is meant by "a given direction" in claim 1 since the direction can only be clockwise or counterclockwise. Applicants again disagree. The claim at issue does not simply refer to a given direction without further reference. Instead, the claim refers to a given direction from the first node to the second node. The Examiner argues at page 3 of the Advisory Action that term "the given direction" can only take on the values clockwise or counterclockwise, and thus the claim language is unclear. However, in the illustrative embodiment of FIG. 4 of the present application, discussed previously herein, traffic to be sent from node A to node Z along the upper portion of the ring 150 using trunks 152 and 154 proceeds in a left-to-right direction along the upper portion of the ring from node A to node Z, and traffic to be sent from node A to node Z along the lower portion of the ring using trunks 156 and 158 proceeds in the same left-to-right direction, but along the lower portion of the ring from node A to node Z. The direction of traffic on the upper and lower portions of the FIG. 4 ring is thus the same, namely, a left-to-right direction from node A to node Z.

The alleged lack of clarity arises in the Examiner attempting to restrict the direction options to clockwise and counterclockwise alone. However, there is no basis for such a restriction in the claim or in the specification.

Moreover, the Sharma reference itself supports the position of Applicants in this regard. For example, Sharma at column 6, lines 36-39, states as follows, with emphasis supplied:

> While from the point of view of the ring, the directions are referred to as clockwise and counterclockwise, from a node's point of view, the two directions are arbitrarily designated upstream and downstream, or west and east.

In claim 1, Applicants chose to define the given direction with reference to the nodes, and not with reference to the ring. Accordingly, the term in question is clear. Moreover, it is apparent from the discussion of FIGS. 2A and 2B in Sharma, at column 6, lines 48-65, that the self-healing four-fiber ring, described there with reference to the directions west and east, does not meet the limitations at issue in claim 1.

Claim 1 thus includes one or more limitations which are not taught or suggested by the proposed combination of Tomizawa and Sharma. The combined teachings of these references therefore fail to "teach or suggest all the claim limitations" as would be required by a proper §103(a) rejection.

Also, as indicated previously, the Examiner has failed to identify a cogent motivation for combining the references or modifying the reference teachings to reach the claimed invention. With regard to motivation, the Examiner provides the following statement at page 4, lines 9-12, of the final Office Action, with emphasis supplied:

> Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate a four-trunk ring and span switching in [Tomizawa] in order to support dynamic routing and restoration of network services in the event of a failed fiber link.

The problem with this statement of motivation is that Tomizawa alone apparently provides the ability to support dynamic routing and restoration of network services in the event of a failed fiber link. See, for example, Tomizawa at page 5, paragraph [0083], and page 8, paragraph [0118]. This being the case, the proffered statement of motivation is deficient, representing nothing more than a hindsight-based conclusory statement. In other words, why would one combine Tomizawa with Sharma if Tomizawa alone already provides the feature that is alleged to be the motivation for the combination?

The Federal Circuit has stated that when patentability turns on the question of obviousness, the obviousness determination "must be based on objective evidence of record" and that "this precedent has been reinforced in myriad decisions, and cannot be dispensed with." In re Sang-Su Lee, 277 F.3d 1338, 1343 (Fed. Cir. 2002). Moreover, the Federal Circuit has stated that "conclusory statements" by an examiner fail to adequately address the factual question of motivation, which is material to patentability and cannot be resolved "on subjective belief and unknown authority." Id. at 1343-1344. There has been no showing in the present §103(a) rejection of objective evidence of record that would motivate one skilled in the art to combine Tomizawa and Sharma or to modify their teachings to meet the limitations in question. The above-quoted statement

of obviousness given by the Examiner in the final Office Action is precisely the type of subjective, conclusory statement that the Federal Circuit has indicated provides insufficient support for an obviousness rejection.

Further, even if it is assumed that a proper *prima facie* case has been established, there are particular teachings in one or more of the references which controvert the obviousness argument put forth by the Examiner. For example, the above-noted teachings in Sharma relating to the self-healing four-fiber ring are believed to teach directly away from the limitations of claim 1. Such a teaching away is believed to constitute strong evidence of non-obviousness.

Applicants therefore respectfully submit that independent claim 1 is allowable over Tomizawa and Sharma.

Independent claims 16 and 17 each include limitations similar to those of independent claim 1, and are believed allowable for reasons similar to those identified above with regard to claim 1.

Dependent claims 2-7 and 10-15 are believed allowable for at least the reasons identified above with regard to claim 1.

In view of the above, Applicants believe that claims 1-7 and 10-17 are in condition for allowance, and respectfully request the withdrawal of the §103(a) rejection.

Respectfully submitted,

Date: October 17, 2005

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CLAIMS APPENDIX

1. A method of routing traffic between first and second nodes in a network so as to provide protection against network failures, the method comprising the steps of:

routing units of traffic on corresponding sets of trunks connected between the first and second nodes such that the traffic is balanced between disjoint paths; and

implementing a restoration process for the traffic;

the first and second nodes being connected by first and second sets of trunks such that the nodes and sets of trunks form a ring having at least four trunks, the first set of trunks carrying traffic in a given direction from the first node to the second node and being associated with one of an upper portion and a lower portion of the four-trunk ring, the second set of trunks carrying traffic in the given direction from the first node to the second node and being associated with the other of the upper portion and the lower portion of the four-trunk ring, wherein each of the first and second sets of trunks includes a primary trunk and a backup trunk, both the primary trunk and the backup trunk of each of the first and second sets of trunks being configurable to carry traffic in the given direction from the first node to the second node;

a given one of the units of traffic comprising a unit of traffic to be transmitted in the given direction from the first node to the second node utilizing one of the upper portion and the lower portion of the four-trunk ring;

wherein the first and second nodes are configured to perform, in conjunction with the restoration process for the given unit of traffic, span switching between the primary trunk and the backup trunk of the associated portion of the four-trunk ring.

2. The method of claim 1 wherein the given unit of traffic comprises one or more OC-*x* units of traffic.

3. The method of claim 1 wherein the restoration process utilizes a service layer switching process comprising a packet-based switching process.

4. The method of claim 1 wherein the restoration process utilizes a service layer switching process comprising an Internet protocol (IP) switching process.

5. The method of claim 1 wherein each of the trunks in a given set of trunks supports a designated portion of at least one of the units of traffic.

6. The method of claim 1 wherein the units of traffic are routed such that a first half of the given one of the units of traffic is routed on the primary trunk, and a second half of the given unit is routed on the backup trunk, in the associated portion of the four-trunk ring.

7. The method of claim 6 wherein the restoration process is implemented using service layer switching.

8. (Canceled)

9. (Canceled)

10. The method of claim 1 wherein the given unit of traffic is split equally between the primary trunk and the backup trunk of the associated upper or lower portion of the ring.

11. The method of claim 1 wherein the given unit of traffic is routed entirely on the primary trunk of the associated upper or lower portion of the ring.

12. The method of claim 1 wherein the ring comprises an IP/optical hybrid ring, and the restoration process is implemented using service layer switching.

13. The method of claim 1 wherein the ring comprises a SONET/optical ring, and the restoration process is implemented using transport layer switching.

14. The method of claim 1 wherein the first and second nodes comprise add-drop multiplexers connected by the sets of trunks, each of the add-drop multiplexers also being coupled to a corresponding router.

15. The method of claim 1 wherein the units of traffic are routed between the first and second nodes so as to provide an opportunity to implement an enhanced quality of service (QoS) for at least one of the units of traffic.

16. An apparatus for routing traffic in a network so as to provide protection against network failures, the apparatus comprising:

first and second network nodes connected by sets of trunks, wherein units of traffic are each routed on a corresponding one of the sets of trunks such that the units of traffic are balanced between disjoint paths between the first and second nodes, the first and second nodes further being configured to implement a restoration process for the traffic;

the first and second nodes being connected by first and second sets of trunks such that the nodes and sets of trunks form a ring having at least four trunks, the first set of trunks carrying traffic in a given direction from the first node to the second node and being associated with one of an upper portion and a lower portion of the four-trunk ring, the second set of trunks carrying traffic in the given direction from the first node to the second node and being associated with the other of the upper portion and the lower portion of the four-trunk ring, wherein each of the first and second sets of trunks includes a primary trunk and a backup trunk, both the primary trunk and the backup trunk of each of the first and second sets of trunks being configurable to carry traffic in the given direction from the first node to the second node;

a given one of the units of traffic comprising a unit of traffic to be transmitted in a direction from the first node to the second node utilizing one of the upper portion and the lower portion of the four-trunk ring;

wherein the first and second nodes are configured to perform, in conjunction with the restoration process for the given unit of traffic, span switching between the primary trunk and the backup trunk of the associated portion of the four-trunk ring.

17. An apparatus for routing traffic in a network so as to provide protection against network failures, the apparatus comprising:

a first network node, the first node being connectable to at least a second network node by sets of trunks, wherein units of traffic are each routed on a corresponding one of the sets of trunks such that the units of traffic are balanced between disjoint paths between the first and second nodes, the first node further being configured to implement at least a portion of a restoration process for the traffic;

the first and second nodes being connected by first and second sets of trunks such that the nodes and sets of trunks form a ring having at least four trunks, the first set of trunks carrying traffic in a given direction from the first node to the second node and being associated with one of an upper portion and a lower portion of the four-trunk ring, the second set of trunks carrying traffic in the given direction from the first node to the second node and being associated with the other of the upper portion and the lower portion of the four-trunk ring, wherein each of the first and second sets of trunks includes a primary trunk and a backup trunk, both the primary trunk and the backup trunk of each of the first and second sets of trunks being configurable to carry traffic in the given direction from the first node to the second node;

a given one of the units of traffic comprising a unit of traffic to be transmitted in a direction from the first node to the second node utilizing one of the upper portion and the lower portion of the four-trunk ring;

wherein the first and second nodes are configured to perform, in conjunction with the restoration process for the given unit of traffic, span switching between the primary trunk and the backup trunk of the associated portion of the four-trunk ring.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None